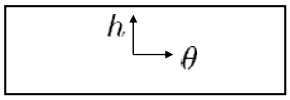
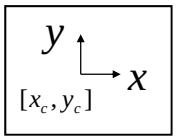
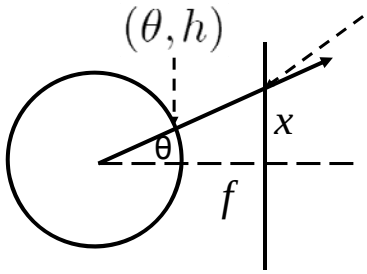
Cylindrical Projection



unwrapped cylinder

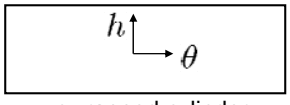


$$(\sin\theta, h, \cos\theta) \propto (x, y, f)$$

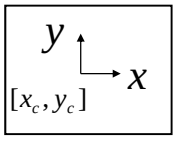


$$\theta = \tan^{-1}\frac{x}{f}$$

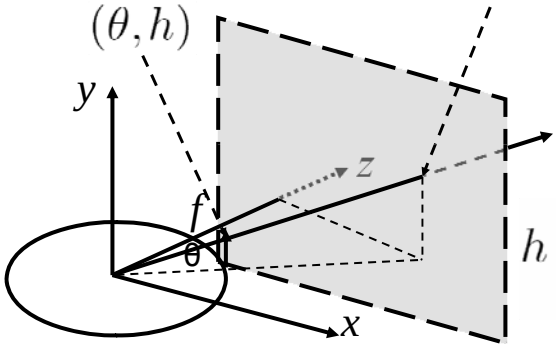
Cylindrical Projection



unwrapped cylinder

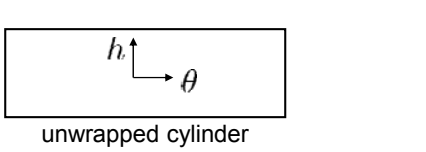


$$(\sin\theta, h, \cos\theta) \propto (x, y, f)$$

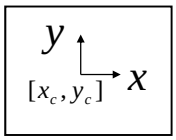


$$h = \frac{y}{\sqrt{x^2 + f^2}}$$

Cylindrical Projection



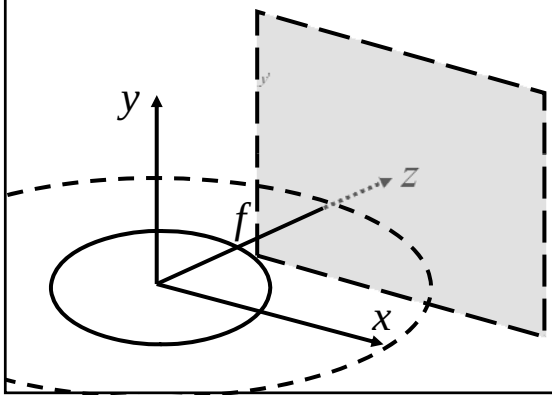
unwrapped cylinder

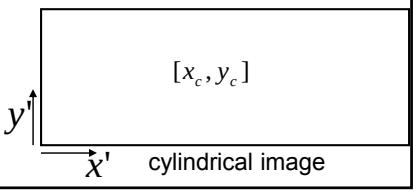


$$x' = s\theta + x_c = s\tan^{-1}\frac{x}{f} + x_c$$

$$y' = sh + y_c = s\frac{y}{\sqrt{x^2 + f^2}} + y_c$$

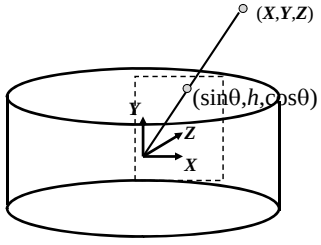
s defines size of the final image, often convenient to set *s* = *f*





cylindrical image

Inverse Cylindrical Projection



$$\begin{aligned}
\theta &= (x_{cyl} - x_c)/f \\
h &= (y_{cyl} - y_c)/f \\
\hat{x} &= \sin\theta \\
\hat{y} &= h \\
\hat{z} &= \cos\theta \\
x &= f\hat{x}/\hat{z} + x_c \\
y &= f\hat{y}/\hat{z} + y_c
\end{aligned}$$